From: Carol Heydon, USGS Northern Rocky Mountain Science Center
Phil Farnes, Snowcap Hydrology
Subject: April 1, 2003 Index of Winter Severity
Date: 5/9/2003

Here are the Index of Winter Severity (IWS) values for April 1, 2003.

The Index of Winter Severity (IWS) is obtained by combining snow water equivalent, critical temperature, and forage availability components to reflect conditions on the winter range. The IWS has a scale from +4 to -4, with +4 representing the mildest conditions and -4 indicating the most severe conditions. The IWS is calculated for each winter range and each species to represent the variation from the norm. It is intended to provide a spatially and temporally standardized indication of climatic conditions on the winter range. The response of individual animals, or groups of animals will vary depending on a variety of factors.

The IWS procedure is described in detail in our report Snowpack Distribution Across Yellowstone National Park, Wyoming. This report, along with daily weather data for the area, historical IWS values, and maps of the winter ranges are available online at http://nrin.nbii.gov/climate/.

While a few areas of the region saw snowpack conditions improve throughout the winter to near normal levels, in general, snow levels through April 1 remained below normal. The low snowpack and warmer than average temperatures combined to produce mild winter conditions for the season. However, forage production indices for last summer indicate these favorable conditions are tempered by below average production on the winter ranges.

Winter Range	For Winter of 2003 to			
	Jan 1	Feb 1	Mar 1	Apr 1
Elk				
Northern Range in Montana	+1.4	+1.7	+0.4	+0.3
Lower Northern Range in YNP	+1.6	+1.8	+1.0	+1.1
Upper Northern Range (Lamar)	+1.7	+1.6	+1.4	+1.2
Madison-Firehole	+1.4	+1.9	+1.3	+1.7
Upper Gallatin	+1.7	+2.1	+1.6	+1.7
Bison				
Lower Northern Range in YNP	+1.1	+1.0	+0.4	+0.4
Upper Northern Range (Lamar)	+1.7	+0.8	+0.9	+0.9
Pelican-Hayden Valley	+0.5	-0.1	-0.9	-0.9
Madison-Firehole	+0.9	+1.2	+0.5	+1.2
Mule Deer				
Lower Northern Range	+1.5	+1.7	+0.5	+0.3
Pronghorn				
Lower Northern Range	+1.0	+1.6	+1.1	+1.2

-4.0 Worst Winter 0.0 About Average Winter +4.0 Mildest Winter

Index for elk uses 45% snow variable, 35% temperature variable (0°F) and 20% forage variable.
Index for bison uses 70% snow variable and 30% forage variable.
Index for mule deer uses 50% snow variable, 30% temperature variable (0°F) and 20% forage variable.
Index for pronghorn uses 55% snow variable, 30% temperature variable (32°F) and 15% forage variable.

The Index of Winter Severity program is a cooperative effort of the USGS Northern Rocky Mountain Science Center's Greater Yellowstone Initiative and Snowcap Hydrology.

Snow Water Equivalent values:

	Snow Water Equivalent, Inches		
	Apr 1	Avg* Apr 1	Percent of Average
Canyon Pillow	13.4	13.9	96%
Crevice Mountain snow course	9.4	10.8	87%
Hebgen Dam snow course	8.2	12.0	68%
Lake Camp snow course	8.8	10.4	85%
Lamar RS CLIM	0.0	2.0	0%
Lupine Creek snow course	7.2	9.9	73%
Norris Basin snow course	7.6	10.8	70%
Northeast Entrance Pillow (new)	11.2	11.3	99%
Old Faithful snow course	10.7	13.9	77%
Tower RS CLIM	0.0	2.3	0%
Twenty One Mile snow course	12.4	16.9	73%
West Yellowstone Pillow (new)	6.5	12.8	51%
Whiskey Creek Pillow	11.2	17.4	64%
Yellowstone Park (Mammoth) CLIM	0.0	.33	0%

* 1971-2000 Base Period
NM – not scheduled for measurement
CLIM SWE is estimated from the weather data. The procedure is described in detail in our report Snowpack Distribution Across Yellowstone National Park, Wyoming.
Note see: http://www.mt.nrcs.usda.gov/swcs/index.html or
http://www.wcc.nrcs.usda.gov/water/w_data.html for a complete list of snow measurements in the area.